# Roadside Features Inventory Program

**Efficiently Managing Assets, Improving Safety and Delivering Projects**

## Performance Measures Report ('05-07 Biennium)

**Roadside Features Inventory Program Description:**

The Roadside Features Inventory Program (RFIP) is an agency program for collecting, storing, and reporting highway features such as supports, culverts, barriers, tree groups, etc. with a focus on fixed objects within the roadway clear zone.

**The RFIP vision:**

A statewide program that helps the agency more efficiently manage assets, improve safety and deliver projects by using the latest technology to locate and inventory roadside features.
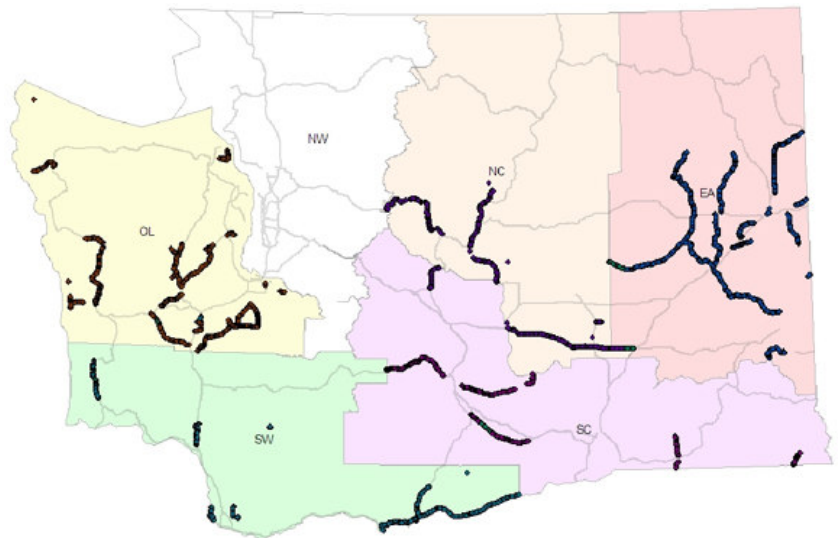
**Highways that have been completed in the RFIP program June '06 to May '07**

**Goals and Purpose:**

- To create a "corporate database" where analysis can be done to compare severity of run-off road accidents to density of fixed objects

- Provides information on the number, types and locations of assets

- Drive future safety investment decisions

- To meet a commitment to Federal Highway Administration (FHWA) that roadside features will be more easily accessible for safety analysis

- Minimizing the cost of collection and maintenance of roadside feature data, by eliminating redundant data collection

**Technical Goals:**

- Establishing consistent data definitions and formats

- Providing standards for collection, data storage methods, and procedures

- Facilitating linking of the RFIP data base with other data bases that store business specific information about a feature

- Providing a standard GIS or tabular format for shared use and maintenance of data

**The RFIP Regional Data Collection**

The RFIP currently has field personnel gathering data in 5 of 6 Regions. The Northwest Region will begin gathering data before the end of 2007 as their existing database of RFIP type data is migrated into the RFIP database and they get their field personnel trained in the new program.

Comparing the volume of data gathered between Regions is very difficult. Even comparing data from month to month inside a single region can be difficult.

Rural vs. Urban, traffic volumes, weather, etc. are all variables that we expect to be minimized by always looking at a 6 month trendline but we will not be able to totally remove these differences.

**How did the data collection get prioritized?**

- Rural areas were selected for safety reasons and to allow the field crews time to learn the new program.

**What has been accomplished in the RFIP?**

- GPS Equipment was tested and selected for program use

- Features and attributes were identified and modeled in a database

- A physical database was created to store the data

- A data dictionary was created for statewide use

- Tools were developed to ensure GPS coordinate data is properly associated to the correct State Route location

- Ability for end users to view the data in either a GIS or tabular report

- Providing program support, GPS training and responding to other needs

- Developed a data collection training/procedures manual and informational web site

- Developed a training/procedures class using the GIS Workbench to view RFIP data

- An informational RFIP Folio has been assembled and distributed throughout the WSDOT

**What Data Has Been Gathered So Far?**

- June 2006 thru April 2007 (11 months) over 174,000 features have been collected. 835 state route miles have been completed in 5 Regions

- Over 48,000 supplemental still images have been collected

- Northwest Region has been collecting RFIP type data for several years. This existing data will be copied into the RFIP Database by August 31st, 2007. This will add over 30,000 more features
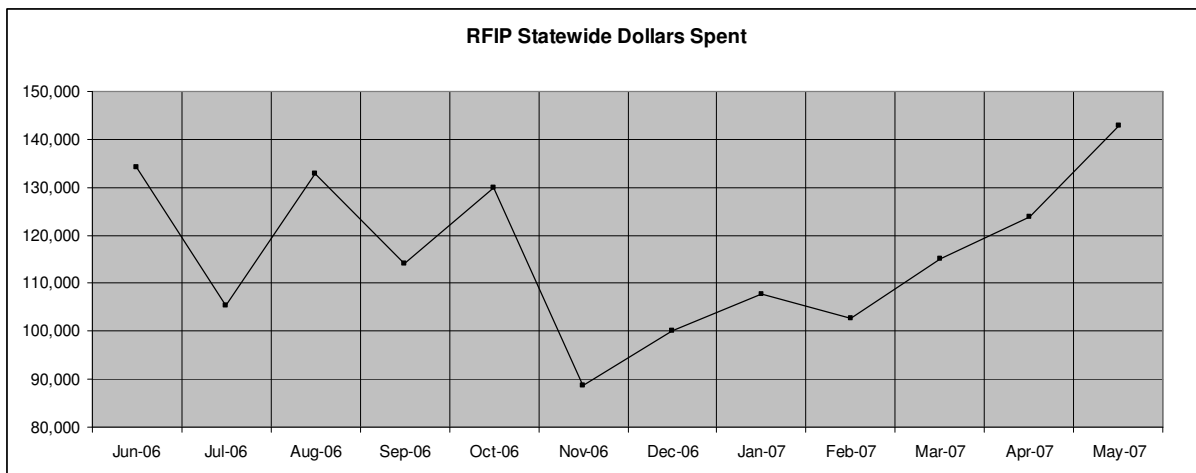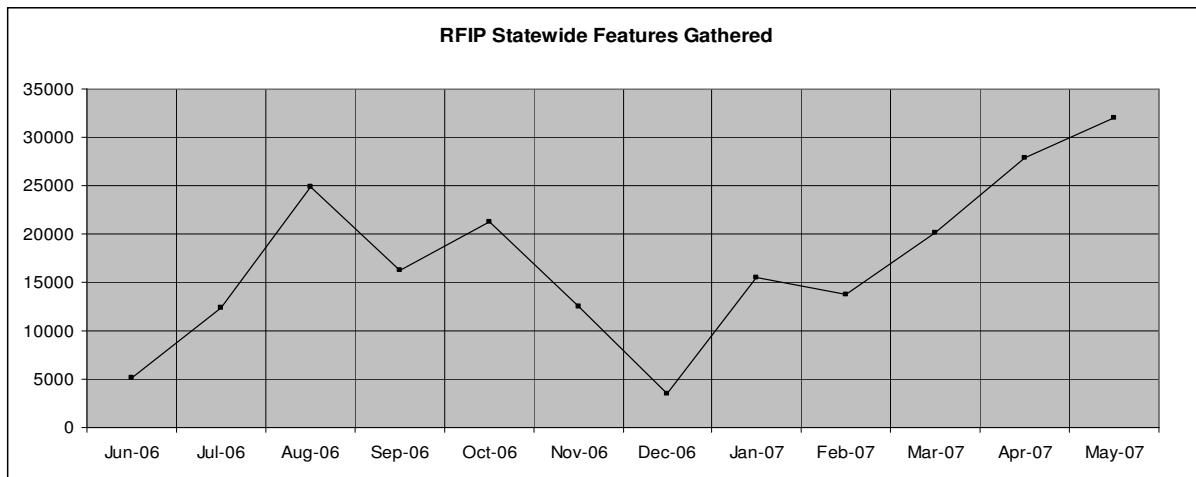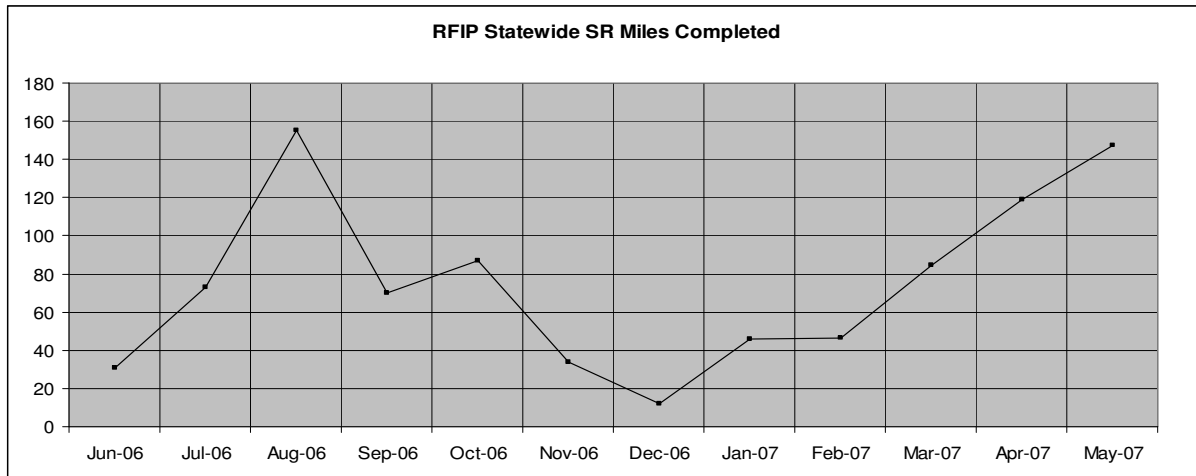
**Where will the program be in the future?**

We project that by the end of 2007, the field personnel will have gathered another 412 miles of highway and 81,000 more features. We expect the field personnel to continue to become more efficient at their data collection tasks but the program is also going to give them more tasks to do in the field to ensure that the data they send into the database is more accurate and much faster for the data steward to load.

By the end of the '07-09 biennium, we project that the program will have collected a total of 781,000 features and 3477 SR miles. This would be about 49% of all the state route miles

We also expect that more efficient data collection devices will be available before the end of the biennium and that the program will probably implement some of these.

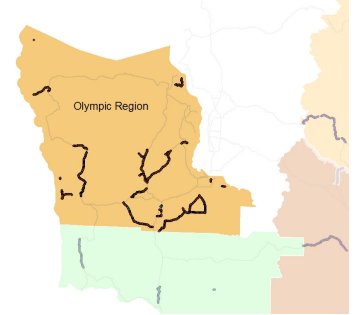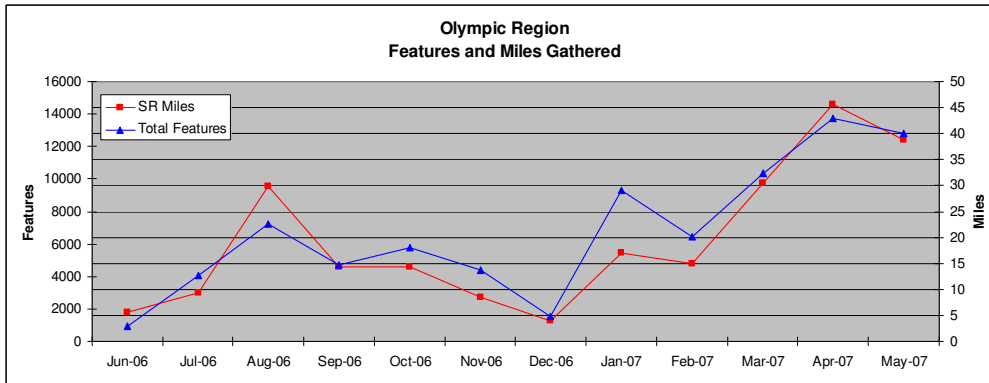## Table of Statewide: $ Spent, Features Gathered, and SR Miles Completed

| Month | 6/06 | 7/06 | 8/06 | 9/06 | 10/06 | 11/06 | 12/06 | 1/07 | 2/07 | 3/07 | 4/07 | 5/07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SR Miles | 30.57 | 72.95 | 155.12 | 69.94 | 87.00 | 33.71 | 12.22 | 45.82 | 46.50 | 84.66 | 119.17 | 147.31 |
| Features | 5,091 | 12,327 | 24,846 | 16,191 | 21,257 | 12,469 | 3,495 | 15,490 | 13,751 | 20,176 | 27,930 | 31,993 |
| $ Spent | 134,197 | 105,390 | 132,866 | 114,073 | 129,892 | 88,753 | 100,037 | 107,734 | 102,830 | 115,240 | 123,843 | 142,927 |



RFIP Statewide SR Miles Completed


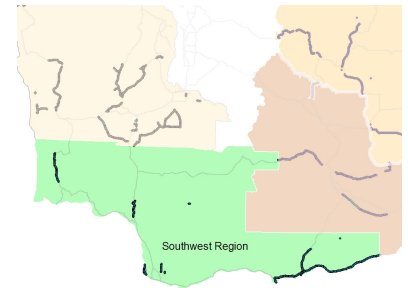
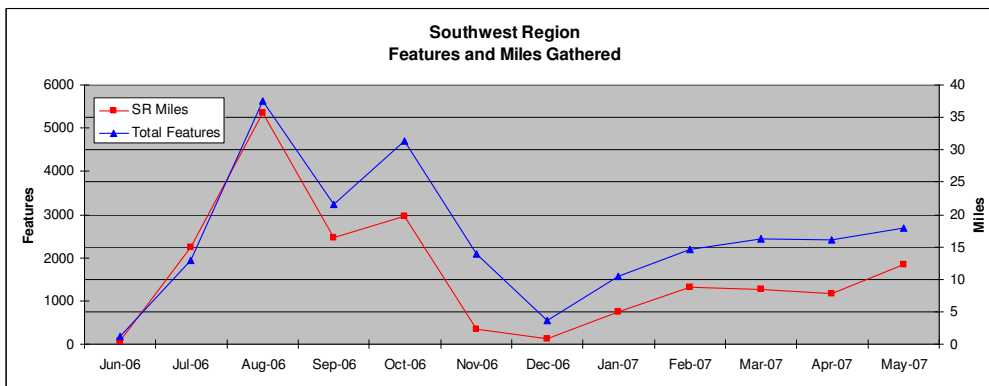RFIP Statewide Features Gathered



RFIP Statewide Dollars Spent

# RFIP Regional Performance Measures
## SR Miles and Features Gathered vs. Time (June '06 thru May '07)

## Olympic Region



**Olympic Region
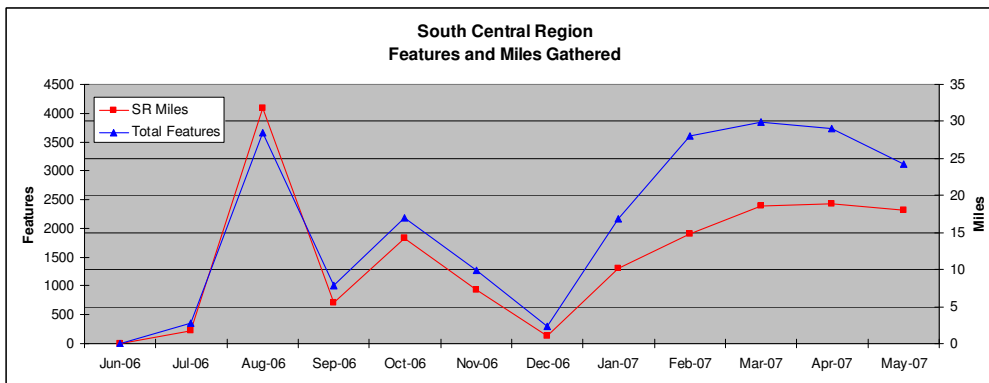Features and Miles Gathered**

## Southwest Region



**Southwest Region
Features and Miles Gathered**

## South Central Region



**South Central Region
Features and Miles Gathered**
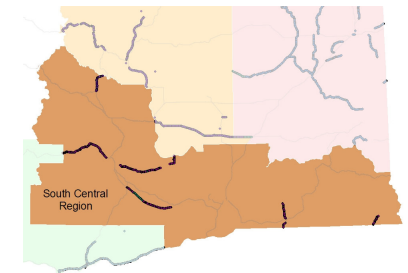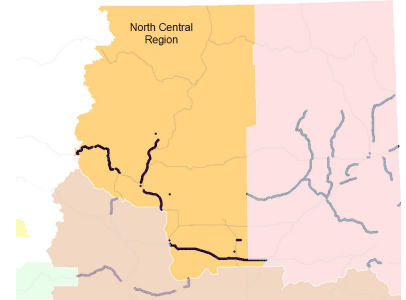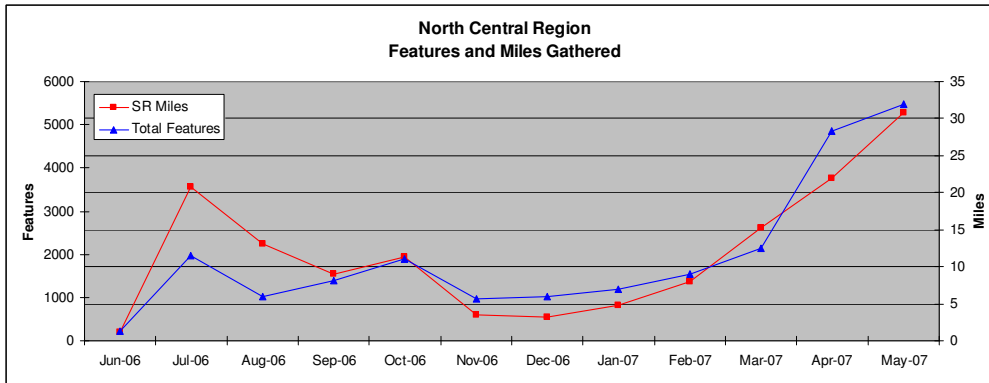
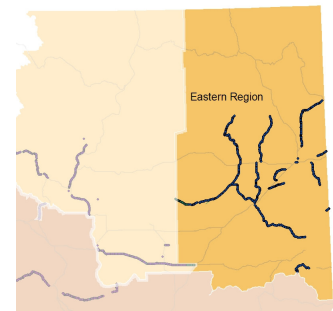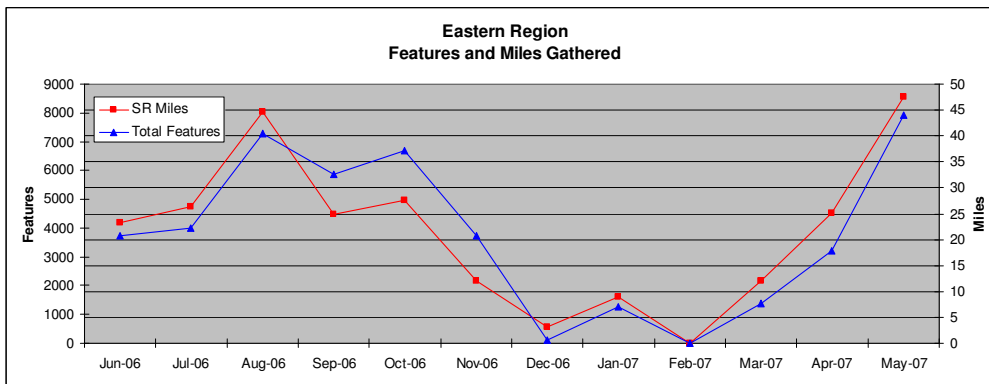# RFIP Regional Performance Measures
## SR Miles and Features Gathered vs. Time (per month)

## North Central Region

**North Central Region**
**Features and Miles Gathered**



## Eastern Region

**Eastern Region**
**Features and Miles Gathered**

# Appendix A:  RFIP Technical Details

**How the RFIP was organized:**

Positions and different teams were established to be responsible for different tasks within the program.

- **Business and IT Project Managers**
  A business and 2 IT Project Co-Managers were selected to oversee each areas portion of the project to ensure success.
- **Advisory Team**
  An Advisory team was established from all Regions and most Business areas to provide overall direction for the program.
- **Project Team**
  A Project team was assembled from critical business areas to help design the program and ensure that the data collected was what the final consumer of the data really needed.
- **Technical Team**
  A Technical team was assembled to actually build, test, and implement the program. The Technical team is also responsible for solving any technical issues identified that need to be fixed or improved.
- **Data Steward**
  The Data Steward was hired to ensure that the data moved into the final database for customer consumption was verified, consistent across all region collection. The Steward also works directly with the technical team during the initial phases for quality control.
- **Program Trainer**
  A program trainer was hired to ensure that the data collection personnel were highly trained and fully supported.
- **Regional Field Personnel**
  The RFIP has averaged 14 field personnel (data collectors) statewide, located and managed by each region.

**What worked well**

Many operations worked very well in the RFIP Program. Even with the very short time given to design, build, and implement the first phase of the program, it was completed on time and we had field personnel trained and collecting data in the Regions on June 1st, 2006.

Here are a few of the items that worked well in the program:

- A statewide standard data dictionary was developed and put into use
- Statewide standard for field personnel data collection procedures were developed and implemented
- Using the "Vertex" data collection technique has made data collection more efficient
- A single statewide standard configuration file for the data collection hardware was developed and implemented statewide. This has made training and support much better
- The decision to take digital images of many features in the field has proven to be valuable
- Statewide standard for exporting the data files associated digital images to the RFIP database
- Our statewide standard TerraSync software has proven to be easy to instruct and learn
- Constant communication between the region supervisors/field personnel and the program trainer has been valuable
- Collaboration with many business areas established a protocol of collecting "what and where" information making the data available for a wider range of uses
- The data is available to a wide range of users through approved Level Playing Field software available for anyone to use that needs it
- Events, feature changes along distance, are displayable in a GIS. This process has not been available in any other GIS collection solution and was designed and developed by the RFIP Technical team.

**What did not work well and what are we doing to improve these areas**

With the many tasks that did work well in the RFIP, we did have some challenges.

- The Regions are able to collect data faster than we can place it into the database and have it available for viewing

  Enhanced processes are just being finished that will give the Regional collectors more ability to edit their data more fully as well as attach the images. This will give us more accurate data and allow the RFIP data steward to move more data into production faster.

- RFIP field personnel can only collect one linear feature at a time

  This issue is still not resolved but new technologies have been identified and will be tested in the near future that will overcome this limitation.

- Some of the high tech solutions from Trimble have proven troublesome

  Trimble's "H-Star" technology, in good conditions, allows a more accurate solution. But in less than ideal conditions, the data quality became very erratic and provided huge errors. The program now has a policy of turning off the H-Star process and the data is now much more stable.

- RFIP program would like to have data collection and post processing software that is customizable

  The Trimble "off the shelf" products we choose because of their stability and placement within the department when the program was starting are not customizable at all. We are looking at new products and technology that will allow the program to create a program that is more efficient in data collection and much more efficient in down stream data processing and storage.

- Cold weather has been a problem on the field collection devices. We are having trouble with some touch screens

  Trimble worked with us in developing a few short term solutions and then released a firmware upgrade to the data logger hardware that seems to have solved the problem.

- Resets of the data collection software are needed too often

  Resets of the data collection hardware are still an issue but with firmware upgrades, they are less often and typically only an annoyance as no data or settings are lost.

- We have had slow response times for data collection equipment repairs

  The slow response time to our issues was related to the local dealer. We worked with the holder of the GPS contract and placed another dealer on the contract and our support issues are much better now.

- Data collection began at a fast pace but a database and loading process were still in development

  We have had several revisions of the transfer software, improving accuracy and data management. The data steward has cleaned thousands of files that had been collected before these processes were in place, and the database has been updated.